Predictors for recovery room delirium in patients undergoing primary elective hip and knee replacement surgery

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Background

- **Delirium** is defined as a transient, usually reversible, cause of cerebral dysfunction and manifests clinically with a wide range of neuropsychiatric abnormalities.

- Delirium is associated with significant *mortality* and *morbidity* and contributes *extra cost* to patient-care.

- **Incidence** of delirium with elective orthopedic surgery can range anywhere from 5% - 42%.

- Research has shown that some of the drugs/techniques anesthetist commonly use in Ortho Cases can increase the risk of post-operative delirium.
Background

- However, many studies on perioperative delirium have small sample sizes, and there are many unanswered questions and inconsistencies in the literature.

- Therefore, further studies are in need to identify possible post-op delirium predictors to help anesthesiologists predict patient’s preoperative delirium risk and minimize post-op delirium.
Objectives

To determine:

1. the incidence of recovery room delirium in patients undergoing primary elective hip and knee replacement surgery

2. the predictors of recovery room delirium in this population

3. if recovery room delirium is associated with prolonged recovery room stay and hospital stay in this population

4. if recovery room delirium is associated with increased institutional care post-discharge in this population
Methods

• A prospective observational study

**Inclusion criteria**

• Primary elective hip and knee arthroplasty at JCC

**Exclusion criteria**

• Repeat surgery
• Preop Nu-DESC score $\geq 2$
• inability to converse in English
• dementia
• severe hearing impairment
• prior enrollment in the study

• We will employ **Nu-DESC** as a tool to assess recovery room delirium
Nu-DESC

• Multiple Delirium Assessment tools available currently:
  • CAM, DDS, DSM-V, Nu-DESC, etc

• Nu-DESC has been validated for detecting delirium
  • Nu-DESC ≥ 2 has a sensitivity 0.95%, specificity 0.87% as compared with DSM-IV (Gold-standard)
  • Radtke et al.2008

• Nu-DESC is also designed for non-clinician usage and takes 1-2 min to complete

• Therefore, it is a suitable delirium screening tool for this study without the need of psychology-trained personnel
## Nu-DESC

<table>
<thead>
<tr>
<th>Features and descriptions</th>
<th>Symptoms (0-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Disorientation</strong></td>
<td></td>
</tr>
<tr>
<td>Verbal or behavioral manifestation of not being oriented to</td>
<td></td>
</tr>
<tr>
<td>time or place or</td>
<td></td>
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<tr>
<td>misperceiving persons in the environment</td>
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<tr>
<td><strong>II. Inappropriate behavior</strong></td>
<td></td>
</tr>
<tr>
<td>Behavior inappropriate to place and/or for the person; e.g.</td>
<td></td>
</tr>
<tr>
<td>, pulling at tubes or dressings, attempting to get out of</td>
<td></td>
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<tr>
<td>bed when that is contraindicated, and the like</td>
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</tr>
<tr>
<td><strong>III. Inappropriate communication</strong></td>
<td></td>
</tr>
<tr>
<td>Communication inappropriate to place and/or for the person;</td>
<td></td>
</tr>
<tr>
<td>e.g. incoherence, non-communicativeness , nonsensical or</td>
<td></td>
</tr>
<tr>
<td>unintelligible speech</td>
<td></td>
</tr>
<tr>
<td><strong>IV. Illusions/Hallucinations</strong></td>
<td></td>
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<tr>
<td>Seeing or hearing things that are not there; distortions of</td>
<td></td>
</tr>
<tr>
<td>visual objects</td>
<td></td>
</tr>
<tr>
<td><strong>V. Psychomotor retardation</strong></td>
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<tr>
<td>Delayed responsiveness, few or no spontaneous actions/words</td>
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<tr>
<td>; e.g., when the patient is prodded, reaction is deferred</td>
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<tr>
<td>and/or the patient is unarousable</td>
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</tbody>
</table>

 Symptom rating: 0 = absence, 1 = mild, 2 = severe;
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Exclusion criteria
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Primary hip/knee replacement

Nu-DESC – Day Surgery

Surgery + Anesthesia

PACU

nu-DESC - PACU

Hospital discharge

Follow-up phone call

30 days

1 hr
Data collection

• All patient data will be reviewed at the end of the data collection period, and patients falling into the exclusion criteria will be removed from data analysis

• Patient demographics, past medical history, type of anesthetics, intraop pharmacological agents, dose of agents used, and pharmacological agents used at the PACU unit will be recorded
Data collection

**Primary outcomes:**

- Nu-DESC score $\geq 2$ at 1hr postop or at PACU discharge if <1hr

**Secondary outcomes:**

- Duration of PACU stay
- Duration of hospital stay
- 30-day mortality
- Unplanned institutional care or rehab after surgery
Sample size calculations

• Anticipated sample size = 1000

  • Incidence of early postoperative delirium for elective surgery ~ 20%

  • 10-15 events per predictor variable are required for a stable model for logistic regression analysis

  • 15 events per variable, include max of 10 independent predictor variables

• Calculated sample size required for our model using logistic regression
  = 15 x 10 / 0.2 = 750
Anticipated results

1. Incidence of recovery room delirium in our institutions

2. Identifying predictors for recovery room delirium
   - Anesthetics
     - GA vs Regional
     - Pharmacological agent
     - Doses
   - Patient characteristics/comorbidities
   - Pharmacological agents used at recovery room

3. Impact of recovery room delirium
   - PACU / Hospital discharge
   - 30 day Mortality
   - Institutional care rates
Significance

• Postoperative delirium is associated with significant morbidity and mortality

• more than 80% patient with recovery room delirium were diagnosed with delirium during their hospital stay

• may potentially alter the practice of anesthesia providers, such as providing judicious intraoperative sedations, for patients who have been identified to have predictors for postoperative delirium
Challenges

• Consistent documentation of Nu-DESC scores by nurses

• Difficulty w/ extracting of dosing on anesthetic chart (ex: propofol infusion dose)

• Nursing education

• Loss of follow-up
Reference